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COSMETIC COMPOSITION COMPRISING AT LEAST ONE CATION,  
ONE LIQUID FATTY ALCOHOL AND AT LEAST ONE CERAMIDE-TYPE  
COMPOUND AND METHOD USING SAME

The present invention relates to a cosmetic  
5 composition for the treatment of keratinous materials  
such as hair, comprising at least one cationic  
surfactant, at least one liquid fatty alcohol and at  
least one ceramide-type compound and to the method of  
nontherapeutic treatment using this composition.

10 Hair formulations which make it possible to  
treat hair damaged by adverse weather conditions or  
physical (blow drying, combing, and the like) or  
chemical (dyeing, permanent waving, and the like) hair  
treatments.

15 One of the means commonly used for improving  
the disentangling and softness of this hair consists in  
using care compositions, and then rinsing the hair with  
water. In general, these compositions are used after a  
shampoo, optionally preceded by one of the above  
20 treatments.

There have already been used for this purpose  
Ceramides or glyceroceramides which have been combined  
with cholesterol esters with the aim of protecting the  
hair fiber. The application of the latter compositions  
25 or of the ceramides alone to the hair leads  
nevertheless to inadequate cosmetic performances, both  
on wet hair and on dry hair.

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Ceramides are generally formulated in thick compositions (cream or gel) containing thickeners with the aim of improving the stability and the suspension of the ceramides in aqueous compositions.

5           Liquid products apply better to the hair and become homogeneously distributed. However, it is difficult to obtain stable aqueous liquid compositions, containing water-insoluble compounds such as ceramide-type compounds.

10           Now, the applicant has discovered, surprisingly, that by using compositions containing at least one cationic surfactant, at least one liquid fatty alcohol in combination with ceramide-type compounds, stable liquid compositions were obtained  
15 which exhibited substantial improvement in cosmetic performances both on wet hair and on dry hair.

In particular, the cosmetic properties such as the property of lending suppleness and sleekness to the fibres with no increase in weight or with no greasy  
20 effect, of softness and of glossiness are superior to those of a composition containing a solid fatty alcohol generally used for improving the stability of compositions. Furthermore, this composition does not require an exposure time.

25           This discovery forms the basis of the present invention.

The subject of the invention is therefore a liquid cosmetic composition intended for the treatment

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of keratinous materials, in particular hair,  
characterized in that it comprises, in a cosmetically  
acceptable aqueous medium, at least one cationic  
surfactant, at least one liquid fatty alcohol and at  
5 least one ceramide-type compound.

The subject of the invention is also the use  
of the composition defined above for protecting  
keratinous materials, in particular the hair, from  
physical or chemical attacks.

10 These composition make it possible to improve  
the cosmetic properties, in particular the softness and  
the sleekness, of the hair.

The expression liquid composition is  
understood to mean compositions having a viscosity of  
15 less than or equal to 1 000 cpoises (1 Pa.s) and  
preferably of between 10 and 500 cpoises (0.01 and  
0.5 Pa.s) and more particularly between 10 and 100 cps  
(0.01 and 0.1 Pa.s).

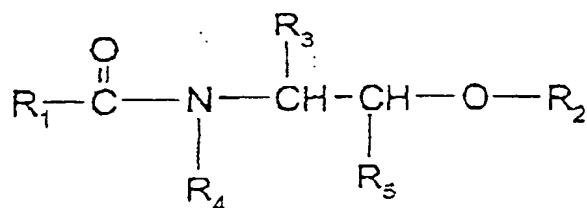
The viscosity is measured at 25°C with a  
20 Rheomat viscometer with a No. 1 needle, at a speed of  
rotation of 200 revolutions/min, the measurement being  
carried out after 30 seconds of rotation (time after  
which stabilization of the viscosity and of the speed  
of rotation of the rotor is observed).

25 According to the present invention, ceramide-  
type compound is understood to mean natural or  
synthetic ceramides and/or glycoceramides and/or  
pseudoceramides and/or neoceramides.

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Ceramide-type compounds are for example described in the patent applications DE4,424,530; DE4,424,533; DE4,402,929; DE4,420,736; WO95/23807; WO94/07844; EP-A-0,646,572; WO95/16665; FR-2,673,179; 5 EP-A-0,227,994; WO94/07844; WO94/24097 and WO94/10131 whose teachings are included herein by way of reference.

Ceramide-type compounds which can be used according to the present invention preferably 10 correspond to the general formula (I):



in which:

- R<sub>1</sub> denotes:
  - 15 - either a saturated or unsaturated, linear or branched, C<sub>1</sub>-C<sub>50</sub>, preferably C<sub>5</sub>-C<sub>50</sub>, hydrocarbon radical, it being possible for this radical to be substituted with one or more hydroxyl groups optionally esterified by an acid R<sub>7</sub>COOH, R<sub>7</sub> being an optionally
  - 20 mono- or polyhydroxylated, linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>35</sub> hydrocarbon radical, it being possible for the hydroxyl(s) of the R<sub>7</sub> radical to be esterified by an optionally mono- or
  - 25 polyhydroxylated, linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>35</sub> fatty acid;

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1 to 12;

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- $R_4$  denotes a hydrogen atom, a methyl or ethyl radical, an optionally hydroxylated, linear or branched, saturated or unsaturated,  $C_3$ - $C_{50}$  hydrocarbon radical, a radical  $-CH_2-CHOH-CH_2-O-R_6$  in which  $R_6$  denotes a  $C_{10}$ - $C_{26}$  hydrocarbon radical or a radical  $R_8-O-CO-(CH_2)_p$ ,  $R_8$  denotes a  $C_1$ - $C_{20}$  hydrocarbon radical,  $p$  is an integer varying from 1 to 12,
- $R_5$  denotes a hydrogen atom or an optionally mono- or polyhydroxylated, linear or branched, saturated or unsaturated,  $C_1$ - $C_{30}$  hydrocarbon radical, it being possible for the hydroxyl(s) to be etherified by a (glycosyl) $_n$ , (galactosyl) $_m$ , sulfogalactosyl, phosphorylethylamine or phosphorylethylammonium radical;
- with the proviso that when  $R_3$  and  $R_5$  denote hydrogen or when  $R_3$  denotes hydrogen and  $R_5$  denotes methyl, then  $R_4$  does not denote a hydrogen atom, or a methyl or ethyl radical.

Among the compounds of formula (I), the ceramides and/or glycoceramides whose structure is described by DOWNING in Journal of Lipid Research Vol. 35, 2060-2068, 1994, or those described in French patent application FR-2,673,179, whose teachings are included herein by way of reference, are preferred.

The compounds of the ceramide type which are more particularly preferred according to the invention are the compounds of formula (I) for which  $R_1$  denotes a saturated or unsaturated alkyl derived from optionally

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hydroxylated C<sub>14</sub>-C<sub>22</sub> fatty acids; R<sub>2</sub> denotes a hydrogen atom; and R<sub>3</sub> denotes an optionally hydroxylated linear C<sub>11</sub>-17, preferably C<sub>13</sub>-15, radical.

Such compounds are for example:

- 5           - 2-(N-linoleoylamino)-1,3-octadecanediol,
- 2-(N-oleoylamino)-1,3-octadecanediol,
- 2-(N-palmitoylamino)-1,3-octadecanediol,
- 2-(N-stearoylamino)-1,3-octadecanediol,
- 2-(N-behenoylamino)-1,3-octadecanediol,
- 10          - 2-[N-(2-hydroxypalmitoyl)amino]-1,3-
- octadecanediol,
- 2-(N-stearoylamino)-1,3,4-octadecanetriol
- and in particular N-stearoylphytosphingosine,
- 2-(N-palmitoylamino)-1,3-hexadecanediol
- 15          or mixtures of these compounds.

Specific mixtures, such as, for example, mixtures of ceramide(s) 2 and ceramide(s) 5 according to the DOWNING classification, can also be used.

- It is also possible to use the compounds of
- 20   formula (I) for which R<sub>1</sub> denotes a saturated or unsaturated alkyl radical derived from C<sub>12</sub>-C<sub>22</sub> fatty acids; R<sub>2</sub> denotes a galactosyl or sulfogalactosyl radical; and R<sub>3</sub> denotes a saturated or unsaturated C<sub>12</sub>-C<sub>22</sub> hydrocarbon radical and preferably a group
- 25   -CH=CH-(CH<sub>2</sub>)<sub>12</sub>-CH<sub>3</sub>.

By way of example, there may be mentioned the product consisting of a mixture of glycoceramides, sold

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under the tradename GLYCOCER by the company WAITAKI INTERNATIONAL BIOSCIENCES.

It is also possible to use the compounds of formula (I) described in patent applications

5 EP-A-0,227,994, EP-A-0,647,617, EP-A-0,736,522 and WO94/07844.

Such compounds are, for example, QUESTAMIDE H (bis-(N-hydroxyethyl-N-cetyl)malonamide) sold by the company QUEST, and cetylic acid N-(2-hydroxyethyl)-N-  
10 (3-cetyloxy-2-hydroxypropyl)amide.

It is also possible to use the N-docosanoyl-N-methyl-D-glucamine described in patent application WO94/24097.

The concentration of ceramide-type compounds  
15 may vary between 0.0001% and 20% by weight approximately relative to the total weight of the composition and preferably between 0.001 and 10% approximately and still more preferably between 0.005 and 3% by weight.

20 The fatty alcohols which are liquid at a temperature of less than 30°C are chosen in particular from linear or branched, saturated or unsaturated, C<sub>10</sub>-C<sub>30</sub> liquid fatty alcohols.

More particularly, the liquid fatty alcohols  
25 are chosen from lauryl alcohol, myristyl alcohol, isomyristyl alcohol, isostearyl alcohol, isocetyl alcohol, isoarachidyl alcohol, 2-octyldodecanol, 2-butyloctanol and oleyl alcohol, and mixtures thereof.

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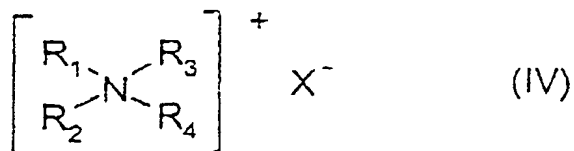


Preferably, the fatty alcohol is chosen from isostearyl alcohol and isocetyl alcohol.

The concentration of liquid fatty alcohols according to the invention may vary between 0.5% and 10% by weight approximately relative to the total weight of the composition, and preferably between 1 and 10% approximately and more preferably still between 1.5 and 3% by weight.

The cationic surfactants may be chosen from:

- 10 A) the quaternary ammonium salts of the following general formula (IV):



in which X is an anion chosen from the group comprising halides (chloride, bromide or iodide) or (C<sub>2</sub>-C<sub>6</sub>)alkyl sulfates, more particularly methyl sulfate, phosphates, alkyl or alkylaryl sulfonates, anions derived from an organic acid such as acetate or lactate, and

- i) the radicals R<sub>1</sub> to R<sub>3</sub>, which may be identical or different, represent a linear or branched aliphatic radical comprising from 1 to 4 carbon atoms, or an aromatic radical such as aryl or alkylaryl. The aliphatic radicals may comprise heteroatoms such as in particular oxygen, nitrogen, sulfur or halogens. The aliphatic radicals are for example chosen from alkyl, alkoxy and alkylamide radicals.

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$R_4$  denotes a linear or branched alkyl radical comprising from 20 to 30 carbon atoms.

Preferably, the cationic surfactant is a salt (for example chloride) of behenyltrimethylammonium.

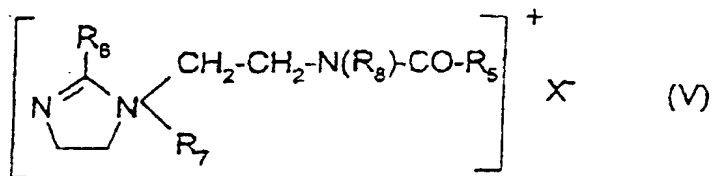
- 5 ii) the radicals  $R_1$  and  $R_2$ , which may be identical or different, represent a linear or branched aliphatic radical comprising from 1 to 4 carbon atoms, or an aromatic radical such as aryl or alkylaryl. The aliphatic radicals may comprise heteroatoms such as in particular oxygen, nitrogen, sulfur or halogens. The
- 10 aliphatic radicals are for example chosen from alkyl, alkoxy, alkylamide and hydroxyalkyl radicals comprising from about 1 to 4 carbon atoms;

- $R_3$  and  $R_4$ , which are identical or different, denote a
- 15 linear or branched alkyl radical comprising from 12 to 30 carbon atoms, said radical comprising at least one ester or amide functional group.

- $R_3$  and  $R_4$  are in particular chosen from
- ( $C_{12}$ - $C_{22}$ )alkylamido( $C_2$ - $C_6$ )alkyl and ( $C_{12}$ - $C_{22}$ )alkyl acetate
- 20 radicals.

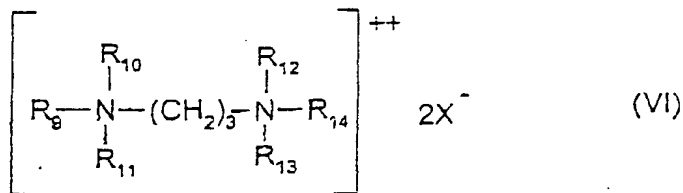
Preferably, the cationic surfactant is a salt (for example chloride) of stearamidopropyl dimethyl (myristylacetate) ammonium.

- B) - the quaternary ammonium salts of
- 25 imidazolinium, such as for example that of the following formula (V):



in which R<sub>5</sub> represents an alkenyl or alkyl radical comprising from 8 to 30 carbon atoms which are for example derived from tallow fatty acids, R<sub>6</sub> represents a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical or an alkenyl or alkyl radical comprising from 8 to 30 carbon atoms, R<sub>7</sub> represents a C<sub>1</sub>-C<sub>4</sub> alkyl radical, R<sub>8</sub> represents a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, X is an anion chosen from the group including halides, phosphates, acetates, lactates, alkyl sulfates and alkyl or alkylaryl sulfonates. Preferably, R<sub>5</sub> and R<sub>6</sub> denote a mixture of alkenyl or alkyl radicals comprising from 12 to 21 carbon atoms which are for example derived from tallow fatty acids, R<sub>7</sub> denotes methyl and R<sub>8</sub> denotes hydrogen. Such a product is for example Quaternium 27 (CTFA 1997) or Quaternium 83 (CTFA 1997) marketed under the names "REWOQUAT" W 75, W90, W75PG, W75HPG by the company WITCO.

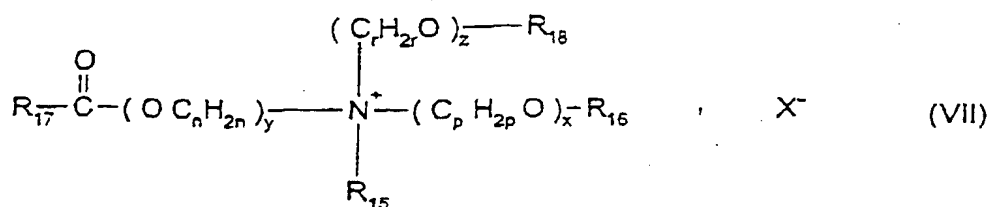
C) - the quaternary diammonium salts of formula (VI):



in which R<sub>9</sub> denotes an aliphatic radical comprising from about 16 to 30 carbon atoms, R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub> and R<sub>14</sub>,

which are identical or different, are chosen from hydrogen or an alkyl radical comprising from 1 to 4 carbon atoms, and X is an anion chosen from the group comprising halides, acetates, phosphates, nitrates and methyl sulfates. Such quaternary diammonium salts comprise in particular propanetallowdiammonium dichloride.

- D) - the quaternary ammonium salts containing at least one ester functional group of the following formula (VII):



in which:

- R<sub>15</sub> is chosen from C<sub>1</sub>-C<sub>6</sub> alkyl radicals and C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl or dihydroxyalkyl radicals;
- 15 - R<sub>16</sub> is chosen from:

- the radical  $\text{R}_{19}-\overset{\text{O}}{\parallel}{\text{C}}-$
- the linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>22</sub> hydrocarbon radicals R<sub>20</sub>,
- the hydrogen atom,

- 20 - R<sub>18</sub> is chosen from:

- the radical  $\text{R}_{21}-\overset{\text{O}}{\parallel}{\text{C}}-$
- the linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>6</sub> hydrocarbon radicals R<sub>22</sub>,
- the hydrogen atom,

- $R_{17}$ ,  $R_{19}$  and  $R_{21}$ , which are identical or different, are chosen from linear or branched, saturated or unsaturated,  $C_7$ - $C_{21}$  hydrocarbon radicals;
  - $n$ ,  $p$  and  $r$ , which are identical or different, are integers having values from 2 to 6;
  - $y$  is an integer having a value from 1 to 10;
  - $x$  and  $z$ , which are identical or different, are integers having values from 0 to 10;
  - $X^-$  is an organic or inorganic, simple or complex anion;
- with the proviso that the sum  $x + y + z$  has a value from 1 to 15, that when  $x$  has a value of 0, then  $R_{16}$  denotes  $R_{20}$ , and that when  $z$  has a value of 0, then  $R_{18}$  denotes  $R_{22}$ .

There are more particularly used the ammonium salts of formula ~~(VII)~~ in which:

- $R_{15}$  denotes a methyl or ethyl radical,
- $x$  and  $y$  are equal to 1;
- $z$  is equal to 0 or 1;
- $n$ ,  $p$  and  $r$  are equal to 2;
- $R_{16}$  is chosen from:
  - the radical  $R_{15}-\overset{\text{O}}{\parallel}{C}-$
  - the methyl, ethyl or  $C_{14}$ - $C_{22}$  hydrocarbon radicals
  - the hydrogen atom;
- $R_{17}$ ,  $R_{19}$  and  $R_{21}$ , which are identical or different, are chosen from saturated or unsaturated, linear or branched  $C_7$ - $C_{21}$  hydrocarbon radicals;

- R<sub>18</sub> is chosen from:

- the radical  $R_{21}-\overset{\overset{O}{\parallel}}{C}-$
- the hydrogen atom.

Such compounds are for example marketed under the names DEHYQUART by the company HENKEL, STEPANQUAT by the company STEPAN, NOXAMIUM by the company CECA, REWOQUAT WE 18 by the company REWO-WITCO. Among the quaternary ammonium salts, behenyltrimethylammonium chloride, or stearamidopropyldimethyl (myristyl acetate) ammonium, which is marketed under the name "CERAPHYL 70" by the company VAN DYK, and Quaternium-27 or Quaternium-83, which are marketed by the company WITCO, are preferred.

The cationic surfactant is present in concentrations ranging from 0.2 to 10% by weight relative to the total weight of the composition and preferably from 0.5 to 5% by weight and more preferably between 1 and 3.5% by weight.

The composition of the invention may also contain at least one additive chosen from thickeners, perfumes, pearlescent agents, surfactants, preservatives, sunscreens, silicones, anionic or nonionic or cationic or amphoteric polymers, proteins, protein hydrolysates, fatty acids, fatty alcohols, hydroxy acids, vitamins, provitamins such as panthenol, vegetable, animal, mineral or synthetic oils and any other additive conventionally used in the cosmetic

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field which does not affect the properties of the compositions according to the invention.

These additives are present in the composition according to the invention in proportions which may range from 0 to 50% by weight relative to the total weight of the composition. The precise quantity of each additive can be easily determined by persons skilled in the art according to its nature and its function.

The cosmetically acceptable aqueous medium may consists solely of water or of a mixture of water and at least one cosmetically acceptable solvent such as monoalcohols, polyalcohols, glycol ethers and mixtures thereof. The monoalcohols are in particular chosen from C<sub>1</sub>-C<sub>4</sub> lower alcohols such as ethanol, isopropanol, tert-butanol, n-butanol; alkylene glycols such as propylene glycol, glycol ethers and mixtures thereof.

Preferably, the composition comprises from 50 to 95% by weight of water relative to the total weight of the composition.

The pH of the compositions is generally between 2 and 12 and preferably between 4 and 9. The pH may be conventionally adjusted to the desired value by adding a base (organic or inorganic base) to the composition, for example aqueous ammonia or a primary, secondary or tertiary (poly)amine such as monoethanolamine, diethanolamine, triethanolamine,

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isopropanolamine or 1,3-propanediamine, or by adding an inorganic or organic acid, preferably a carboxylic acid such as for example citric acid.

The compositions in accordance with the invention may be more particularly used for the treatment of keratinous materials such as the hair, skin, eyelashes, eyebrows, nails, lips, scalp and more particularly the hair.

The subject of the invention is also a method for treating keratinous materials such as the skin or hair, characterized in that it consists in applying to the keratinous materials a cosmetic composition as defined above, and then in optionally rinsing with water.

Thus, this method according to the invention makes it possible to hold the hair style or to treat or care for the skin, the hair or any other keratinous material.

The compositions of the invention may also be provided in the form of a shampoo, of a conditioner to be rinsed out or not, of compositions for permanent waving, hair straightening, dyeing or bleaching, or in the form of rinse-out compositions, to be applied before or after shampooing, dyeing, bleaching, permanent waving or hair straightening or between the two stages of permanent waving or hair straightening.

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The compositions of the invention can be used more especially as a hair composition whose application is optionally followed by rinsing with water.

Accordingly, the invention relates to the use  
5 of this composition as or for the manufacture of a composition to be applied before or after any hair treatment such as shampooing, dyeing or bleaching, permanent waving or hair straightening.

The compositions according to the invention  
10 may be used as leave-in products, in particular for holding the hair style, for hair shaping or for hair styling.

They are more particularly hair setting lotions, blow drying lotions, fixing compositions  
15 (lacquers) and hair styling compositions.

The compositions may be packaged in various forms, especially in vaporizers, pump dispensers or in aerosol containers so as to allow application of the composition in vaporized form or in mousse form. Such  
20 forms of packaging are suitable for example when it is desired to obtain a spray, a lacquer or a mousse for treating the hair.

When the composition according to the invention is packaged in aerosol form so as to obtain a  
25 lacquer or an aerosol mousse, it comprises at least one propellant which may be chosen from volatile hydrocarbons such as n-butane, propane, isobutane, pentane, a chlorinated and/or fluorinated hydrocarbon

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and mixtures thereof. It is also possible to use, as propellant, carbon dioxide gas, nitrous oxide, dimethyl ether, nitrogen, compressed air and mixtures thereof.

In all the text which follows or in all the preceding text, the percentages expressed are by weight.

The invention will now be illustrated more fully with the aid of the following examples which cannot be considered as limiting it to the embodiments described.

In the examples, AS means active substance.

The compositions of the following examples are for example obtained by heating the fatty alcohol and ceramide mixture to 70-80°C and then adding the mixture of water and cationic surfactant heated to the same temperature; the mixture is then vigorously stirred with a turbine for about 10 minutes. The mixture is then allowed to cool, with stirring, to room temperature.

#### EXAMPLE 1

A rinse-out conditioner of the following composition was prepared:

Behenyltrimethylammonium chloride

(GENAMIN KDM-F from HOECHST CHIMIE) 2.4 g AS

Isostearyl alcohol 2 g

N-oleyldihydrosphingosine (ceramide) 0.4 g

Cetylstearyl alcohol (50/50 by weight) 0.5 g

(DC949 from DOW CORNING)

Perfume, preservatives

Demineralized water

100 g

Hair treated with this composition has excellent

5 cosmetic properties of suppleness, softness, feel and  
gloss with no increase in weight. These effects are  
obtained with no exposure time.